What is claimed is:

1. An electrode comprising:
an electrically conductive matrix containing a disulfide group, wherein an S-S bond of the disulfide group is cleaved by electrochemical reduction and reformed by electrochemical oxidation; and
a plurality of carbon nanotubes being substantially disentangled and dispersed in the electrically conductive matrix.

2. An electrode of claim 1 wherein the electrode is substantially free of an aggregate of the carbon nanotubes.

3. An electrode of claim 1 wherein the carbon nanotubes have an average diameter of 3.5 to 200 nanometers and an average length of 0.1 to 500 micrometers.

4. An electrode of claim 1 wherein the carbon nanotubes have an average diameter of 5 to 30 nanometers and an average length of 100 to 10000 times the diameter thereof.

5. An electrode of claim 1 wherein the electrode contains 0.5 to 6 percent by weight of the carbon nanotubes based on a sum of the electrically conductive matrix and the carbon nanotubes.

6. An electrode of claim 1 wherein the electrode contains 1 to 4 percent by weight of the carbon nanotubes based on a sum of the electrically conductive matrix and the carbon nanotubes.

7. An electrode of claim 1 wherein the electrode has a sheet configuration.

8. An electrode of claim 1 wherein the electrically conductive matrix contains an electrically conductive polymer and an organic compound having the disulfide group.

9. An electrode of claim 8 wherein the electrically conductive polymer comprises a polymer represented by a formula:

$$-[Ar-NH]_n-$$

wherein Ar is aryl, and n is an integer.

10. An electrode of claim 8 wherein the organic compound contains a 5 to 7 membered, heterocyclic ring containing 1 to 3 heteroatoms consisting of a nitrogen atom and a sulfur atom.

11. An electrode of claim 1 wherein the electrically conductive matrix contains an electrically conductive polymer having the mercapto group which is capable of forming disulfide group.

12. A method for producing disentangled carbon nanotubes, said method comprising the steps of:
adding a plurality of aggregates of carbon nanotubes to a liquid; and
providing sheer force onto the liquid for disentangling the aggregates of carbon nanotubes therein.

13. A method of claim 12 wherein the providing step comprises passing the liquid through a narrow gap at a high speed.

14. A method of claim 13 wherein the providing step comprises adding the liquid into a homogenizer.

15. A method of claim 14 wherein the homogenizer comprises:
a stator;
a rotor wherein the stator and the rotor define a narrow gap therebetween; and

at least one blade being fixed to one of the stator and the rotor and being disposed in the narrow gap.

16. A method of claim 12 wherein the liquid comprises at least one of an organic solvent and water.

17. A lithium battery, comprising:
(a) a cathode having:
an electrically conductive matrix containing a disulfide group, wherein an S-S bond of the disulfide group is cleaved by electrochemical reduction and reformed by electrochemical oxidation; and
a plurality of carbon nanotubes being substantially disentangled and dispersed in the electrically conductive matrix;
(b) an anode having an active material for releasing lithium ions; and
(c) an electrolyte being disposed between the cathode and the anode.

18. A lithium battery of claim 17 wherein the cathode is substantially free of an aggregate of the carbon nanotubes.

19. A lithium battery of claim 17 further comprising:
(d) a cathode current collector contacting with the cathode; and
(e) an anode current collector contacting with the anode.

20. A lithium battery of claim 19 wherein the cathode current collector, the cathode, the electrolyte, the anode, and the anode current collector have a layered structure and are laminated each other in this order.

21. A lithium battery of claim 17 wherein the cathode has a thickness ranging from 5 to 500 micrometers.

22. A lithium battery of claim 17 wherein the cathode has a thickness ranging from 10 to 100 micrometers.

23. A lithium battery of claim 19 wherein the cathode current collector has a sheet configuration.

24. A lithium battery of claim 19 wherein the cathode current collector comprises metallic foil.

25. A lithium battery of claim 17 wherein the carbon nanotubes have an average diameter of 3.5 to 200 nanometers and an average length of 0.1 to 500 micrometers.

26. A lithium battery of claim 17 wherein the cathode contains 0.5 to 6 percent by weight of the carbon nanotubes based on a sum of the electrically conductive matrix and the carbon nanotubes.

27. A lithium battery of claim 17 wherein the electrically conductive matrix contains an electrically conductive polymer and an organic compound having the disulfide group.

28. A lithium battery of claim 27 wherein the electrically conductive polymer comprises a polymer represented by a formula:

$$-[Ar\text{-}NH]_n-$$

wherein Ar is aryl, and n is an integer.

29. A lithium battery of claim 17 wherein the electrically conductive matrix contains an electrically conductive polymer having the disulfide group.

30. A lithium battery of claim 17, wherein the electrolyte comprises at least one of a solid electrolyte and a gel electrolyte.